

Scope

- Give a brief on 1080 in NZ
- Outline research with two communities to assess risk of 1080 uptake in plants
- Results of this research
- Discussion and risk assessment
- Further information -1080 database

Aerial application of 1080

- Mainly for possum and rabbit control
- Helicopter or fixed-wing aircraft
- 1080 in cereal or carrot
- Public acceptability?

Public acceptability

- For our research, Maori community team
- Maori often voice strong concern about aerially-applied 1080
- Key concerns are
 - Toxin movement through ecosystems
 - Risks to non-target species
- Question raised: if 1080 bait landed by food plants, could 1080 end up in that food?

Project aim

- To determine the uptake and persistence of 1080 in watercress and puha

Our approach

- Collaborative
 - Kaikoura Runanga
 - Lake Waikaremoana Hapu Restoration Trust
 - Tuhoe Tuawhenua Trust
- Selected study sites
- Medical Officer of Health permission
- Set up experiments, sampling
- Sample analysis
- Risk analysis

Watercress



Study site



Field experiment

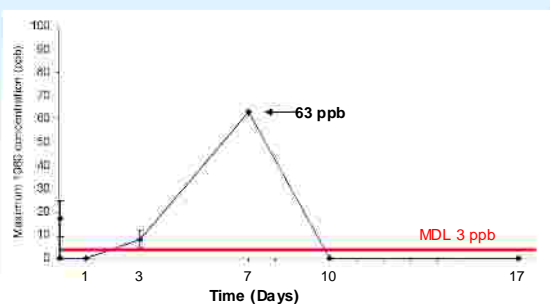


- Cage in sediment for 10 watercress plants
- Bait placed in cage to hold in position
- Watercress sampled at 0, 1, 3, 7, 10, 17 days
- Frozen on dry ice, 1080 analysis

Gas Chromatography



Results



Values show maximum in plants with 1080 bait at each time point

Risk to Humans -Watercress

- LD₅₀ for humans estimated at 2 mg/kg
- A 70 kg person = 140 mg 1080 for an LD₅₀

$$\frac{140 \text{ mg}}{0.000063 \text{ mg/g}} = 2,200,000 \text{ g}$$

- Maximum 1080 concentration 63 ppb, 70 kg person eat 2.2 tonnes for an LD₅₀
- Therefore negligible risk of poisoning from eating watercress after an aerial 1080 operation

Previous Plant Studies

<i>Myriophyllum triphyllum</i>	25 ppb
<i>Elodea canadensis</i>	8 ppb
Broadleaf	6 ppb
Ryegrass	8 ppb
Pikopiko	0
Karamuramu	5 ppb



Pikopiko



Karamuramu

Puha

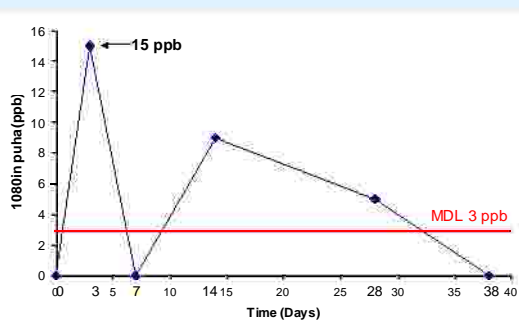


Study site



- Caged 10 puha plants
- Bait in smaller cage at base of each plant
- Sampled at 0, 3, 7, 14, 28, 38 days
- Frozen on dry ice, 1080 analysis

Results



Values show maximum in plants with 1080 bait at each time point

Risk to Humans -Puha

- LD₅₀ for humans estimated at 2 mg/kg
- A 70 kg person = 140 mg 1080 for an LD₅₀

$$\frac{140 \text{ mg}}{0.000015 \text{ mg/g}} = 9,333,333 \text{ g}$$

- Maximum 1080 concentration 15 ppb, 70 kg person eat 9.3 tonnes for an LD₅₀
- Therefore negligible risk of poisoning from eating puha after an aerial 1080 operation

But.....MDL

- MDL of 3 ppb imposed by lab
- When removed, 59 of 60 samples had 1080
- Includes plants before bait, non-toxic controls
- Appears that puha contains trace 1080

Day	Range (ppb)	Mean (ppb)
0	0 – 1.6	0.38
3	0.5 – 15.4	4.17
7	0.4 – 2	0.99
14	0.3 – 9.2	2.37
28	2.5 – 5.1	3.75
38	0.2 – 0.6	0.32

Does naturally occur

- Common tea brands 0.2 – 1.2 ppb
- Guar gum (dairy products) 7 – 14 ppb
- Puha on day zero 0 – 1.6 ppb
- First time seen in wild NZ plant



Conclusions -Watercress

- Watercress takes up 1080, but also eliminates it
- 1080 seen at low concentrations –63 ppb
- No 1080 detected above the MDL after day 10
- Zeros were zeros
- Negligible risk of secondary poisoning to humans

Conclusions -Puha

- Puha can take up 1080, but also eliminates it
- 1080 seen at low concentrations in puha -15 ppb
- Negligible risk of secondary poisoning to humans
- No 1080 detected above the MDL after day 38
- MDL removed, 59 of 60 samples showed 1080 at concentrations comparable to tea leaves
- Appears that 1080 occurs naturally in puha
 - First time seen for NZ plant

Final Remarks

- New work progressing:
 - Wider 1080 survey of NZ plants
 - Other NZ plant toxins as alternatives to 1080
- Note website on 1080 impacts on Taonga Species

Website Approach

- Find all existing 'peer-reviewed' material on this subject
- Review it
- Summarise this information in an accessible format
- Make all literature available (where legal)

www.lincoln.ac.nz/1080

